

the greatest that had occurred for several years prior to that time.

The following extract from a letter, dated Navasota, Tex., August 18, 1899, from Hon. Rufus Grimes, who has resided in Grimes County in the neighborhood of seventy years, is an interesting bit of flood history pertaining to the Brazos River:

In regard to the overflows of the Brazos River, my information comes from several men who had been repeatedly through portions of Texas previous to the introduction by S. F. Austin of his 300 families as colonists. These men told my father when I was a small boy (Mr. Grimes was born in 1819), and told me after I had attained the age of maturity, that the Brazos River had not been out of its banks for over thirty years until 1822, when there was a great overflow. The next overflow was in 1833, which came in May of that year; this overflow was considered by the early settlers the greatest overflow that had ever been known by white people in the streams west of the Mississippi River. I passed over the prairie where the present City of Navasota now stands in May, 1833, and the back water was 2 to 4 feet deep all over the prairie. I can not state positively the difference between the overflow of 1833 and that of the present year (1899), but I think the water was several feet higher at this place in 1833 than in 1899. The 1833 overflow did very little damage, as there was not exceeding 100 acres in cultivation in the present Grimes County portion of the Brazos bottom, and there was no stock in the bottoms.

The next overflow was in 1843. Perhaps the greatest damage done by this overflow was the destruction of a grist and flour mill on Beason's Creek near the present town of Courtney, constructed to run by water power.

I do not remember anything of the overflow of 1852.

The overflow of 1899 has been by far the most destructive of any that we have ever had, for the reason that in recent years there has been a mania among farmers for bottom lands, and nearly all the bottom lands are in cultivation. While I do not think that any overflow since 1833 has been as high as that by 5 or 6 feet, the present flood has destroyed crops, stock, and other valuables amounting to perhaps two or three times the value of that destroyed by all preceding overflows combined in Grimes County.

I have never known of any loss of life from overflows on the Brazos until the flood of 1899.

Mr. John R. Fenn, Duke, Tex., has had a cattle ranch in the Brazos bottoms for many years and has noted the high water marks of the several floods. In a letter dated Duke, Tex., August 19, 1899, Mr. Fenn gives valuable information regarding overflows, as follows:

Both in 1833 and 1843 the creeks and lakes in this locality were dry; in fact there was no water in the county whatever, and all waters of the two floods were brought down by the rivers from up the country, while in 1899 every creek and slough was filled to its utmost by the heavy rains prior to the overflow; such being the case there could not have been any more river water brought down the stream in 1899 than in 1833. The flood of 1899 is the only overflow that has hurt the farmers of this section of Texas. All previous floods came before planting time, or sufficiently early to enable farmers to replant their crops. The overflow of 1852 was 18 or 20 inches below the highest water mark of 1843.

Efforts are being made to obtain reliable information from other points along the Brazos regarding the early floods, and if anything of interest is secured the same will be submitted for publication as a supplement to this report. I wish to acknowledge valuable assistance from Col. John D. Rogers, of Galveston, for references in connection with the early floods of the Brazos.

#### MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of the Central Meteorologico-Magnetic Observatory, the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the *Boletín Mensual*. An abstract, translated into English measures, is here given, in continuation of the similar tables published in the MONTHLY WEATHER REVIEW since 1896. The barometric means have not been reduced to standard gravity, but this correction will be given at some future date when the pressures are published on our Chart IV.

#### Mexican data for July, 1899.

Stations.	Altitude.	Mean barometer.	Temperature.			Relative humidity.	Precipitation.	Prevailing direction.	
			Max.	Min.	Mean.			Wind.	Cloud.
Colima.....	Feet. 1,600	Inch. .....	° F. 91.4	° F. 68.0	° F. .....	% .....	Inch. .....	.....	.....
Cullacán Rosales (E. d. S.).....	112	29.71	97.5	73.4	85.1	67	9.00	ne.	.....
Durango (Seminario).....	6,243	24.06	107.6	55.4	69.4	65	4.08	sw.	se.
Leon (Guanaajuato).....	5,934	24.33	86.7	52.7	68.9	68	5.70	se.	se.
Mexico (Obs. Cent.).....	7,472	23.07	78.8	50.9	62.1	68	3.33	n.	ne.
Morelia (Seminario).....	6,401	23.98	77.0	53.6	64.0	80	7.85	e.	ne.
Oaxaca.....	5,164	25.10	95.0	52.7	68.2	78	5.46	nw.	ne.
Puebla (Col. Cat.).....	7,112	23.37	78.6	51.1	65.7	80	8.40	ese.	ese.
Saltillo (Col. S. Juan).....	5,339	24.33	88.3	61.7	73.2	64	1.30	nnw.	se.
San Isidro (Hac. de Guanaajuato).....	.....	.....	77.4	66.2	.....	.....	7.83	se.	.....
Silao.....	6,063	24.30	80.1	59.7	70.0	.....	7.91	ese.	ese.
Tuxpan.....	19	30.13	104.9	69.8	84.0	79	3.69	e.	e., s.
Zapotlan (Seminario).....	5,078	25.20	85.1	57.2	69.8	66	6.23	n.	s., e.

#### VOLCANIC ERUPTIONS IN HAWAII.

By CURTIS J. LYONS (dated July 29, 1899).

In reference to my note "Sun spots and Hawaiian eruptions," in the MONTHLY WEATHER REVIEW for April, page 144, the Editor remarks that only one side of the question is presented.

The distinction which I make between crater activities and actual flows of lava was not, I perceive, sufficiently emphasized in that article. It was the intention to do that by the heading of the second column, viz, "Most important lava flows or eruptions."

The flow of 1877 should have been added to the list as belonging to the minimum sun spot period of 1878. This leaves only the brief and unimportant flow of 1851, which might be regarded as only preliminary to 1852, so that very little indeed can be said on the other side if the distinction above made is observed.

The newspapers, of course, make the most of every source of excitement and count brilliant activities in both Kilauea and Mauna Loa in the same category with flows of lava. The latter change the topography of the island and, moreover, cause what is termed "volcano weather," and are preceded and accompanied by vast volumes of smoke, not steam.

This smoke rises to a height which I carefully estimated on a previous occasion (in 1877) to be 16,000 feet above the summit of the mountain, making 30,000 feet above sea level, and then floats off to the northeast, carried in a horizontal direction by the upper current. On this occasion it appears to have sunk to the level of the sea about 600 miles from Hawaii and was then brought back by the trade wind, covering the entire group with heavy smoke from the 18th to the 20th, fourteen days after the eruption. The steamer *Mariposa*, coming from San Francisco, met the smoke cloud at the above distance from Honolulu. At first the smoke was overhead, then as the steamer proceeded it covered everything at sea level. Meanwhile the disturbance caused by the local heat on Hawaii had interrupted the trades to leeward, and a surface southerly current brought the light lower smoke to Honolulu on the 12th of July.

The editor's reference to "only one side of the question" was intended to suggest that in investigating the connection between two remote subjects, such as solar sun spots and Hawaiian eruptions, it is necessary to consider, not only the agreements of the facts with any given hypothesis, but also the cases of disagreement, and it is not clear that the latter has been properly done in the present case. We have not at hand a complete list of the eruptions of lava from Mauna

Loa, Kilauea, and Hualaloi, (which are, we believe, the only three active craters in the island of Hawaii, and, for that matter, in the whole of the Sandwich Islands), but the date 1851 is given in the Encyclopedia Britannica in addition to those given in Mr. Lyons' two articles, and there are discrepancies enough between the exact dates of eruptions and the sun spots to make one wonder how there can be any causal connection between the two. In some cases the eruptions appear to precede the sunspots, in other cases they follow. In one case the eruptions between 1851 and 1859 seem to have favored the maximum sun spots quite as much as the minimum.—ED.

### OBSERVATIONS AT RIVAS, NICARAGUA.

The records contributed for many years by Dr. Earl Flint, at Rivas, Nicaragua, include barometric readings. His present station is at 11° 26' N., 85° 47' W. The observations at 7:17 a. m., local time, are simultaneous with Greenwich 1 p. m. The altitude of this barometer is now said to be 4 feet above ground; the thermometer 6 feet above ground; the rain gage 7 feet above ground. The ground is 210 feet above sea level. Until the barometer has been compared with a standard it seems hardly necessary to publish the daily readings. The wind force is recorded on the Beaufort scale, 0-12. When cloudiness is less than  $\frac{1}{10}$ , the letter "F," or "Few," is recorded.

This station is situated on the western shore of Lake Nicaragua, not far from the eastern end of the western division of the Nicaragua Canal. The volcano Ometepe, on an island in Lake Nicaragua, is about 10 miles northeast of the station. Dr. Flint's records occasionally mention the presence of clouds on the summit of this mountain.

Dr. Flint's reports to the Weather Bureau now embrace two distinct features, namely, the simultaneous morning observations and the daily climatological summary, as given in the two following tables for each month.

*Simultaneous observations at 1 p. m. Greenwich (or 7:17 a. m. local) time, July, 1899.*

Date.	Temperature.		Wind.		Upper clouds.			Lower Clouds.		
	Air.	Dew-point.	Direction.	Force.	Kind.	Amount.	Direction from.	Kind.	Amount.	Direction from.
1.....	79	72	ne.	5	cs.	2	sw.	k.	2	ne.
2.....	78	74	ne.	5	.....	.....	.....	kn.	10	ne.
3.....	76	73	ne.	5	.....	.....	.....	sk.k.	1,9	ne.
4.....	77	75	ne.	6	.....	.....	.....	k.	8	ne.
5.....	78	71	ne.	7	ok.	10	se.	.....	.....	.....
6.....	80	73	ne.	5	ok.	10	sw.	k.	Few	ne.
7.....	80	73	ne.	6	ok.	8	sw.	ak.	2	ne.
8.....	80	73	ne.	7	.....	.....	.....	ak.	4	ne.
9.....	80	73	ne.	5	.....	.....	.....	k.	10	ne.
0.....	80	73	ne.	5	cs.,ok.	9	sw.	k.	1	ne.
1.....	80	73	ne.	5	ok.	10	sw.	k.	Few	ne.
12.....	76	74	n.	0	.....	.....	.....	ak.	10	n.
13.....	78	74	ne.	3	.....	.....	.....	sk.k.	9	ne.
14.....	77.5	73	ne.	0	.....	.....	.....	f.k.	10	ne.
15.....	78	75	ne.	3	.....	.....	.....	k.	10	ne.
16.....	79	76	ne.	5	.....	.....	.....	f.k.	10	ne.
17.....	81	77	ne.	6	ok.	5	sw.	f.k.	1	ne.
18.....	81	74	ne.	6	.....	.....	.....	f.k.	9	ne.
19.....	76	73	ne.	6	.....	.....	.....	kn.	10	ne.
20.....	79	76	ne.	3	.....	.....	.....	f.k.	9	ne.
21.....	75	73	n.	0	.....	.....	.....	kn.	10	n.
22.....	77	73	ne.	5	ok.	8	sw.	f.k.	1	ne.
23.....	78.5	73	n.	5	ok.,c.	10	sw.	k.	Few	ne.
24.....	77	73	ne.	3	.....	.....	.....	f.k.	10	ne.
25.....	78	75	ne.	2	.....	.....	.....	f.k.	10	ne.
26.....	77	74	se.	3	.....	.....	.....	k.	10	se.
27.....	75.5	73	ne.	0	.....	.....	.....	sk.k.	9	ne.
28.....	77	74	ne.	3	.....	.....	.....	sk.f.k.	8	ne.
29.....	79	75	ne.	4	.....	.....	.....	sk.,k.	1	ne.
30.....	79	75	ne.	5	ok.	6	sw.	k.*	Few	ne.
31.....	77.5	74	se.	3	.....	.....	.....	k.	8	se.
Means.....	78.2	.....	.....	.....	.....	.....	.....	.....	.....	.....
Departure.....	+1.3	.....	.....	.....	.....	.....	.....	.....	.....	.....

\*On Ometepe.

*Climatological observations for twenty-four hours ending at 7:17 a. m. local (or 1 p. m. Greenwich) time, July, 1899.*

Date.	Temperature.		Wind.		Average cloudiness.	Total rainfall.
	Maximum.	Minimum.	Prevailing direction.	Maximum force.		
1.....	84	76	ne.	.....	4	8
2.....	84.2	78	ne.	.....	6	7
3.....	84	77	ne.,se.	.....	6	10
4.....	84.5	78	ne.	.....	5	9
5.....	86.5	78	ne.	.....	6	6
6.....	89	77	ne.	.....	7	10
7.....	86.5	78	ne.	.....	6	9
8.....	89	78.5	ne.	.....	6	4
9.....	87	79	ne.	.....	7	6
10.....	89	79	ne.	.....	5	7
11.....	88	78.5	ne.	.....	5	8
12.....	87	79	ne.	.....	5	9
13.....	88	75	ne.	.....	4	9
14.....	87	77	ne.	.....	4	8
15.....	87	78.5	ne.	.....	4	9
16.....	84	77	ne.,se.	.....	4	10
17.....	84.2	77	ne.	.....	5	9
18.....	88.6	77	ne.	.....	6	2
19.....	86	79	ne.	.....	7	7
20.....	87	75	ne.	.....	6	5
21.....	87	78	ne.	.....	4	9
22.....	83	75	n.,ne.	.....	5	10
23.....	84.5	76	ne.	.....	6	5
24.....	86	77	ne.	.....	7	9
25.....	88	77	ne.	.....	6	10
26.....	83	77	ne.	.....	5	8
27.....	77.2	75	ne.,se.	.....	5	10
28.....	83	75	ne.,se.	.....	3	7
29.....	85	76	ne.	.....	5	4
30.....	88	77	ne.	.....	5	5
31.....	87	78	ne.,e.	.....	5	7
Sums.....	.....	.....	.....	.....	.....	10.69
Departure.....	.....	.....	.....	.....	.....	+3.93

\*The rainfall at 3 p. m., June 30, was reported on that date. Strictly speaking, therefore, the rainfall for June is 7.53 and that for July is 10.85, and the 0.06 measured at 1 p. m. of July 31 belongs to the record for August.

Since early in June farmers have asked me for forecasts of rain, but to all I have replied, "No rain until the northeast trades cease." On the 15th the wind veered to southeast, with sprinkles at 9 a. m., but then back to northeast. Little hope for the first corn crop. Great complaints of dryness from Costa Rica. On the 31st, although the July rains are 3.93 above normal, yet there is still complaint of dryness.

### THE TORNADO AT NEW RICHMOND, WIS.

By Prof. O. G. LIBBY, Madison, Wis.

The Editor has received from Prof. O. G. Libby, instructor in history at the University, Madison, Wis., quite a full special report on the tornado of June 12, 1899, that destroyed the City of New Richmond, Wis., from which he makes the following extracts:

I observed the ruins and other phenomena for two weeks after the tornado occurred, while aiding the sufferers. Mr. Emil Gerde, of Star Prairie, Wis., stated that he saw the storm approach and watched its first destructive action. He states that the cloud had three parts, a central cone larger than the others and showing a square ragged base, with the body twisted like a rope. On either side of this was a smaller cone that swung free in and out, to and fro, licking up a building, leaping and swaying as the cloud advanced. Sometimes a considerable distance separated them, and then again they would be close together. The western cone was larger than the eastern. The cones were of a yellowish tint, like flames, especially the central one. Intense darkness preceded the storm, the noise was like that of an immense wheel turned by machinery, in which there was considerable slack, so that the sound was uneven. The sun shone out after the storm. The reports from Polk County indicate three paths of destruction, the central one being the worst of all. I crossed the central path twice in driving near Clear Lake, where the bushes were stripped of bark and old logs lying partly in the ground, had been moved for some distance. Even on a sloping hill covered with small bushes, everything was bruised and pounded flat, as though logs had been rolled or dragged over the surface.

Among the numerous details given by Mr. Libby, we select